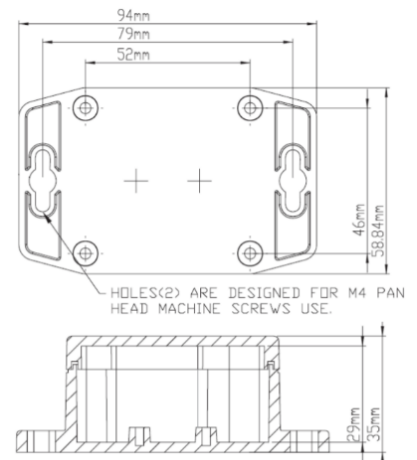


# ELT Ultrasonic

## Description

ELT Ultrasonic distance sensor can be placed in various environments to measure distance as well as temperature, humidity, and atmospheric pressure. It is enclosed in an IP67 box and is designed to be mounted outside. ELT Ultrasonic is the ideal sensor for measuring in advanced places or extreme weather conditions, and has the capacity of measuring with remarkably long range.



## Applications

- Bin and tank level measurements
- Water level measurements (under bridges or wells e.g.)
- Smart cities
- Agriculture
- Industries
- Extreme weather conditions
- Exposed areas (containers e.g.)

## Product features

- LoRaWAN Certified <sup>CM</sup>
- Compatible with LoRaWAN<sup>®</sup> 1.0.3
- Measures ambient temperature
- Measures ambient humidity
- Detects acceleration
- Measures ambient atmospheric pressure
- IP67 Classified
- Battery-powered
- NFC for configuration
- Configuration over the air

## Device Specifications

### Mechanical specifications

Weight	195 g excluding batteries / 215 g including batteries
Dimensions	94 x 59 x 35 mm excluding horn / 94 x 59 x 85,7 including horn
Enclosure	IP67
Direct connection to:	Maxbotix ultrasonic distance sensor

### Operating conditions

Temperature	-40 to 60 °C (85 °C with external power supply)
Humidity	0 to 100% RH

Radio / Wireless	
Wireless Technology	LoRaWAN® 1.0.3
Wireless Security	LoRaWAN® End-to-End encryption (AES-CTR), Data Integrity Protection (AES-CMAC)
LoRaWAN Device Type	Class A/C (configurable) End-device
Supported LoRaWAN features	OTAA, ABP, ADR, Adaptive Channel Setup
Link Budget	137 dB (SF7) to 151dB (SF12)
Available Frequencies	US902 – 928, EU863 – 870, AS923, AU915 – 928, KR920 – 923, RU864, IN865
RF Transmit Power	14 dB / 20 dB (Region specific)

Device Logging Function	
Sampling Interval	Configurable via NFC and downlink configuration
Data Upload Interval	Configurable via NFC and downlink configuration

Device Power Supply	
Battery Type	1 x 3.6V AA Lithium Battery
Expected Battery Life	<10 years (Depending on configurations and environment)

Ultrasonic Distance Sensor	
Distance Range	30 cm – 5 meter. Targets closer than 30 cm will typically range as 30 cm.
Range Output	Serial, 1 mm resolution
Dimensions	Length 50.7 mm. Outer diameter 43.8 mm.
Model	MaxBotix MB7389 HRXL-MaxSonar-WRMT

Data types			
Type value	Type	Data size	Comment
0x01	Temperature	2	-3276.5 °C – 3276.5 °C (Value of: 100 → 10.0 °C)
0x02	Humidity	1	0 – 100 %
0x07	VDD (Battery voltage)	2	0 – 65535 mV
0x0E	External distance	2	0 – 65535 mm
0x0F	Motion (Acceleration)	1	0 – 255 (Interrupts from accelerometer)
0x14	Pressure	4	Pressure data (hPa)
0x3D	Debug information	4	Data depends on debug information
0x3E	Sensor settings	n	Sensor setting sent to server at startup (first package). Sent on Port+1.

## Internal sensors

### Temperature

Resolution: 0.1 °C

Accuracy:  $\pm 0.2$  °C (See figure 1)

### Humidity

Resolution: 0.1 % RH

Accuracy at 25 °C:  $\pm 2$  % RH (See figure 2)

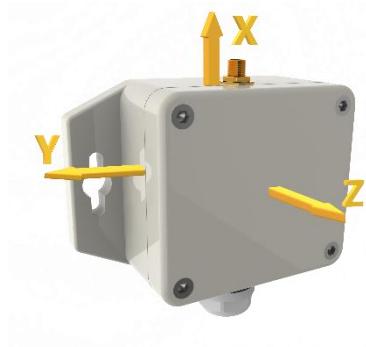
Accuracy of humidity over temperature: See figure 3

### Accelerometer

Range:  $\pm 2.0$  g

Sensitivity: 16 mg/digit

Data rate: 10 Hz



### Atmospheric pressure

Range: 260 – 1260 hPa

Accuracy:  $\pm 1$  hPa

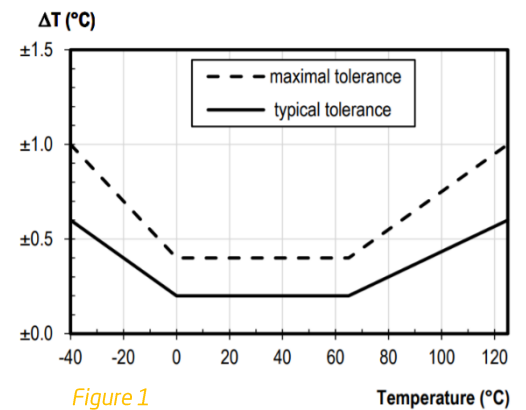


Figure 1

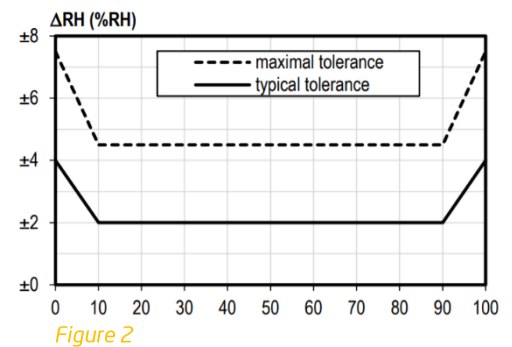


Figure 2

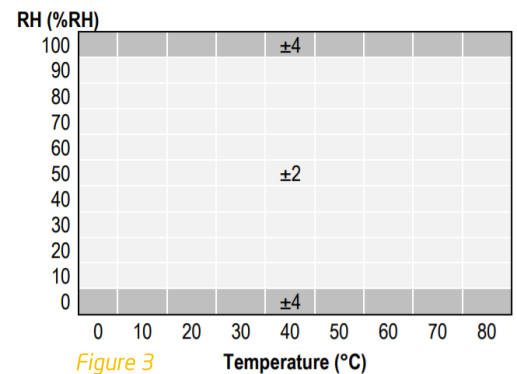


Figure 3

## Beam pattern for distance sensor

Sample results for measured beam pattern are shown on a 30-cm grid. The detection pattern is shown for dowels of varying diameters that are placed in front of the sensor.

- A 6.1-mm (0.25-inch) diameter dowel
- B 2.54-cm (1-inch) diameter dowel
- C 8.89-cm (3.5-inch) diameter dowel

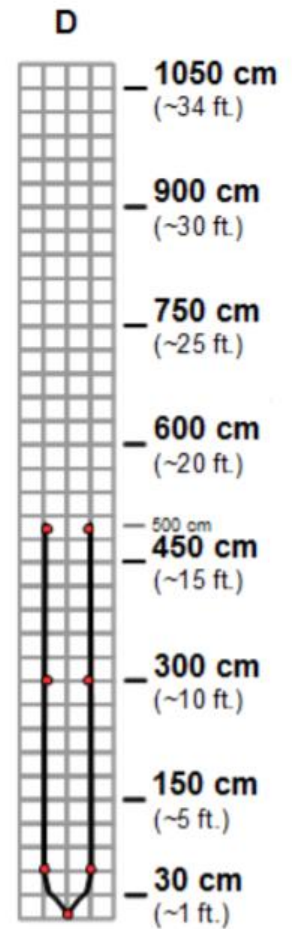
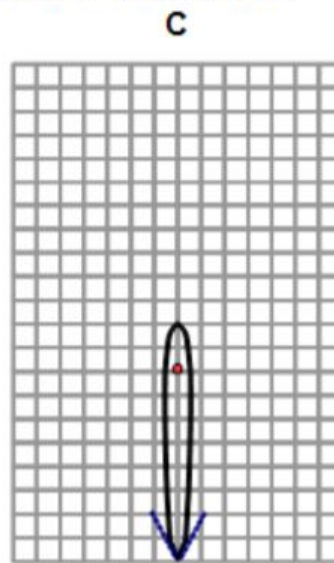
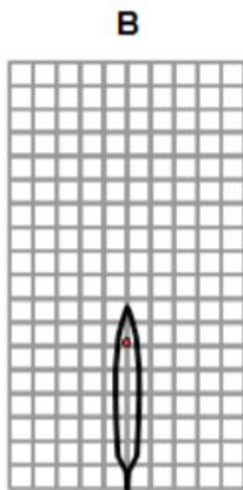
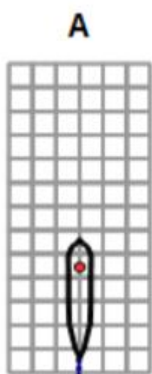
D 11-inch wide board moved left to right with the board parallel to the front sensor face.

This shows the sensor's range capability.  
**Note:** For people detection the pattern typically falls between charts A and B.

■ Partial Detection

— 5.0 V

● 3.3 V



Note that ELT Ultrasonic's voltage range is 3.3 – 3.6 V.